CLAIMS

What is claimed is:

1. A method of removing a photoresist layer from an integrated circuit (IC) structure having an etched dielectric layer with an exposed barrier layer, wherein said dielectric layer comprises silicon and oxygen and said barrier layer is composed of a material selected from a group consisting of silicon nitride and silicon carbide, said method comprising:

feeding a first gas mixture into a reactor wherein said first gas mixture comprises carbon monoxide (CO);

generating a plasma in said reactor; and

selectively removing said photoresist layer with little or no etching of said exposed barrier layer.

2. The method of claim 1 wherein said dielectric material is silicon dioxide.

3. The method of claim 1 wherein said first gas mixture further comprises oxygen (O_2).

4. The method of claim 1 wherein said first gas mixture further comprises nitrogen (N_2).

5. The method of claim 1 wherein said first gas mixture further comprises the gas mixtures selected from the group consisting of oxygen (O_2), nitrogen (N_2), nitrogen (N_2)/oxygen (O_2), nitrous oxide (N_2O), ammonia (NH_3), nitrogen (N_2)/hydrogen (H_2), and water vapor (H_2O).

6. The method of claim 1 wherein said etched dielectric material is composed of a material selected from the group consisting of silicon dioxide, silicon oxide, organosilicate glass, and fluorinated silicate glass.

7. The method of claim 1 wherein said IC structure further comprises a cap layer located between said dielectric and said photoresist, said cap layer is composed of a material selected from the group consisting of silicon dioxide, silicon oxynitride, silicon carbide and silicon nitride.

8. The method of claim 1 wherein said reactor used to remove said photoresist from said IC structure is also used to etch said dielectric.

9. A method of removing a photoresist layer from an integrated circuit (IC) structure having an etched first dielectric layer, an exposed second barrier layer wherein said barrier layer is composed of a material selected from a group consisting of silicon nitride and silicon carbide, and a third layer that includes a conductive interconnect that abuts said barrier layer and a second dielectric material adjacent said conductive interconnect, said barrier layer between said etched first dielectric layer and said third layer, comprising:

feeding a first gas mixture into a reactor wherein said first gas mixture comprises carbon monoxide (CO);

generating a plasma in said reactor; and

selectively removing said photoresist layer with little or no etching of said exposed barrier layer.

10. The method of claim 9 wherein said first dielectric layer and said second dielectric layer is comprised of materials that include silicon and oxygen.

11. The method of claim 9 wherein said first gas mixture comprises the gas mixtures selected from the group consisting of oxygen (O_2), nitrogen (N_2), nitrogen (N_2)/oxygen (O_2), nitrous oxide (N_2O), ammonia (NH_3), nitrogen (N_2)/hydrogen (H_2), and water vapor (H_2O).

12. The method of claim 9 wherein said etched first dielectric layer is composed of a material selected from the group consisting of silicon dioxide, silicon oxide, organosilicate glass, and fluorinated silicate glass.

13. The method of claim 9 wherein said IC structure further comprises a cap layer located between said photoresist layer and said first dielectric layer, said cap layer is composed of a material selected from the group consisting of silicon dioxide, silicon oxynitride, silicon carbide and silicon nitride.

14. The method of claim 9 wherein said reactor used to remove said photoresist from said IC structure is also used to etch said first dielectric layer.

15. A method of removing a photoresist layer from an integrated circuit (IC) structure having an etched dielectric layer with an exposed barrier layer, wherein said barrier layer is composed of a material selected from a group consisting of silicon nitride and silicon carbide, said method comprising:

feeding a first gas mixture into a reactor wherein said oxidizing gas mixture comprises carbon monoxide (CO), wherein said oxidizing gas mixture comprises the gas mixtures selected from the group consisting of oxygen (O_2), nitrogen (N_2), nitrogen (N_2)/oxygen (O_2), nitrous oxide (N_2O), ammonia (NH_3), nitrogen (N_2)/hydrogen (H_2), and water vapor (H_2O);

generating a plasma in said reactor; and

selectively removing said photoresist layer with little or no etching of said exposed barrier layer.

16. The method of claim 13 wherein said dielectric layer is comprised of materials that include silicon and oxygen.

17. The method of claim 13 wherein said etched dielectric layer is composed of a material selected from the group consisting of silicon dioxide, silicon oxide, organosilicate glass, and fluorinated silicate glass.

18. The method of claim 13 wherein said IC structure further comprises a cap layer located between said dielectric layer and said photoresist, said cap layer is composed of a material selected from the group consisting of silicon dioxide, silicon oxynitride, silicon carbide and silicon nitride.

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19. The method of claim 13 wherein said reactor used to remove said photoresist from said IC structure is also used to etch said dielectric layer.